

Remarks

This application has been carefully reconsidered in view of the Office Action of April 25, 2003.

With respect to the provisional double-patenting rejections based upon application serial nos. 09/206,207 and 09/206,208, it is noted that Notices of Allowance have now issued for these applications. Accordingly, since the provisional obviousness-type double-patenting rejections will become actual double-patenting rejections, applicants submit herewith terminal disclaimers against application serial nos. 09/206,207 and 09/206,208.

By this amendment, dependent claims 38 – 43 are presented herewith. Claims 38 and 39 are directed to the same subject matter as present claims 19 and 18, respectively, but are made dependent from independent claim 20. Support for the subject matter is found in applicants' specification in the paragraph bridging pages 19 and 20.

Claim 40 depends from claim 20 and specifies that the maximum diene content, as a result of the hydrogenation procedure, is at least 0.1 wt. %. Claims 41 and 42 specify maximum diene concentrations of 0.05 and 0.03 wt. %, respectively. Support for the subject matter of these claims is found in applicants' specification in the first full paragraph of page 20.

New dependent claims 43 and 44 depend from claim 20 and recite the olefin content of the feedstock and the effluent as being within the range of ± 15 wt. % and ± 10 wt. %, respectively. Support for these claims is found in applicants' specification in the paragraph bridging pages 9 and 10 of the specification. In view of the addition of claims 43 and 44, an amendment has been made in claim 20 to provide clear antecedent basis for the recitation of "effluent" in the dependent claims.

Reconsideration and allowance of this application is respectfully requested in view of the foregoing amendments and the following remarks.

The rejection of claims 17 – 20 and 37 as unpatentable over EPA 109,060 to Colombo in view of U.S. Patent no. 4,078,011 to Glockner et al. or U.S. Patent no. 4,347,392 to Cosyns et al. is respectfully traversed. For the reasons advanced below, applicants would respectfully submit that the teachings of Colombo and Glockner et al. or Cosyns et al. cannot be selectively combined in order to arrive at applicants' invention without a hindsight reconstruction of the prior art references which can be made only with the benefit of applicants' disclosure. Further, it is to be recognized that even if one of ordinary skill in the art, were, after considering applicants' disclosure, to attempt to combine Colombo and Glockner et al. or Cosyns et al., the result would not involve the selective hydrogenation of dienes in an olefin-rich stream to form at least one olefin, and further to form a feedstock having a maximum diene concentration of 0.1 wt. % as called for in independent claim 37 and as now called for in dependent claim 40. ✓

Turning first to the rejection based upon Colombo and Glockner, it is noted that the secondary reference, Glockner, does not disclose a selective hydrogenation of a feedstock for purposes even remotely similar to those involved in Colombo or in applicants' process. As the Examiner acknowledges, Colombo does not disclose a process for cracking of a feedstock containing dienes and further, does not disclose a procedure involving the hydrogenation of dienes. The patent to Glockner discloses the hydrogenation of dienes, but the Glockner procedure is not concerned in any respect with the hydrogenation of a feedstock to be applied to a cracking process of any nature. In fact, cracking is not even mentioned in Glockner except as a source of an alkylation feedstock. In Glockner, the hydrogenation procedure is carried out in order to arrive at an olefin stream to be used as the feed in an alkylation process. Thus, the

purpose of hydrogenation as disclosed in Glockner is to arrive at mono-olefins suitable for alkylation. Clearly, there is nothing in Glockner which would lead one of ordinary skill in the art to consider the Glockner process for the hydrogenation of dienes in a feedstock to be applied to a cracking process of any sort.

The Office Action observes that the primary reference, Colombo, does not require the presence of dienes. However, the absence in Colombo of any reference to dienes clearly would not suggest to one of ordinary skill in the art a process for the hydrogenation of dienes. More to the point, however, is the fact that the patent to Colombo does not require the absence of dienes, and further, there is no disclosure in Colombo of a maximum diene content of 0.1 wt. % as called for in claim 37 and is now called for in dependent claim 40. Further, even if one of ordinary skill in the art, after considering applicants' disclosure, were to attempt to combine the teachings of Colombo and Glockner, the result would be to seek to avoid more than 1 % dienes ⁽²⁾ since this is what Glockner disclosed for its alkylation feedstock. The result would not be to arrive at a maximum diene content of 0.1 wt. % or 0.05 or 0.03 wt. % as called for in dependent claims 41 and 42, respectively.

The Office Action does not appear to discuss the secondary reference to Cosyns et al. and accordingly, offers no basis for combining the teachings of Cosyns with Colombo. However, it is clear that the Cosyns procedure is not directed to the treatment of a feedstream in an olefin cracking process, and in fact, there is nothing in Cosyns to suggest that the Cosyns procedure would be suitable for such a process. Cosyns is actually directed to the selective hydrogenation of diolefins and acetylenes in feedstocks containing ethylene and/or propylene. Presumably, the objective in Cosyns is to arrive at such feedstocks useful in the production of polyethylene or polypropylene. Clearly, there is nothing in Cosyns which would suggest the application of the

Cosyns process to the treatment of a feedstock in an olefin cracking process. (2)

As demonstrated by the foregoing remarks, it is respectfully submitted that the combinations of the secondary references, Glockner et al. or Cosyns et al. with Colombo as the primary reference cannot be made in a manner to arrive at applicants' invention, even if it were appropriate to use applicants' teachings as a basis for combining the diverse teachings of the references. This, however, is not the appropriate standard to be applied in combining prior art teachings. The appropriate standard forbids using an applicant's own disclosure as a basis for assembling prior art teachings and requires a suggestion or motivation in the prior art as reflected in decisions in *ACS Hospital Systems, Inc. v. Montefiore Hospital*, 221 USPQ 929 (Fed. Cir. 1984) and *Ex parte Giles* 228 USPQ 886 (PTO Bd. Of Appeal. And Int. 1985). As expressed by the Board in *Giles* at 688:

Only appellant's disclosure and not the prior art provides a motive for achieving the combination as claimed by the appellant. To imbue one of ordinary skill in the art with knowledge of the invention . . . when no prior art reference or references of record convey or suggests that knowledge is to fall victim to the insidious effect of a hindsight syndrome wherein that which only the inventor taught is used against its teacher.

Attention is also respectfully invited to the Federal Circuit decision in *In re Fine*, 5 USPQ2d 1956 (Fed. Cir. 1988) wherein the Court stated at 1600:

It is essential that "the decisionmaker forget what he or she has been taught at trial about the claimed invention and cast the mind back to the time the invention was made . . . to occupy the mind of one skilled in the art who is presented only with the references, and who is normally guided by the then-accepted wisdom in the art." *Id.* One cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention. (Emphasis added)

The admonitions in *Ex parte Giles* and *In re Fine* are to step back in time to evaluate the invention only in the context of what is disclosed in the references without regard to what is disclosed in appellants' specification. When this is done, it is believed clear that one of ordinary

skill in the art would not arrive at applicants' invention based only upon the references and "the then-accepted wisdom in the art." It is only with the benefit of hindsight after a reading of applicants' disclosure, would it occur to one of ordinary skill in the art to attempt to combine Glockner et al., directed to alkylation feeds, or Cosyns et al., directed to polymerization feeds, with Colombo in an attempt to hydrogenate dienes, which are non-existent in Colombo, to arrive at an olefin cracking feedstock.

As further acknowledged in the Office Action, the Colombo reference fails to disclose the use of an MFI catalyst having a silicon/aluminum atomic ratio of 180 – 1000 as required in applicants' claims. Instead, Colombo merely refers to a silicon/aluminum ratio of at least 175 with no upper limit, disclosing a catalyst in which no aluminum is present, *i.e.* a silicon/aluminum ratio of infinity. Thus, the teaching in Colombo is that the silicon/aluminum atomic ratio is of no significance and, in fact, that it makes no difference whether or not aluminum is even present in the catalyst. Applicants would respectfully submit that the Examiner is in error in suggesting that the disclosure of a very broad range would in itself render obvious a specific narrower range included within the broad range. Specifically, to the extent that the rejection relies upon the premise that the disclosure of very broad ranges encompassing narrow ranges amounts to a disclosure of such narrow ranges or renders the use of such ranges obvious, applicants would respectfully disagree. It is believed to be well established that the existence in the prior art of broad ranges which encompass narrow ranges presented in the claims does not establish lack of novelty or obviousness of such ranges. In this regard, attention is respectfully invited to *In re Russell*, 169 USPQ 426, CCPA (1971) wherein the court in reversing the rejection of the claims stated:

Essentially, appellant's contention is that the employment of the proportions recited in the claims unexpectedly yields clear compositions without the need for a filtration step. Appellant's position on the law is sound, for even though part of appellant's range of proportions, and all of his ingredients, are

suggested by the broad teaching of Wei, if appellant can establish that his relatively narrow ranges yield unexpectedly superior results as against the broad Wei ranges as a whole, appellant will have established unobviousness of the claimed invention. See *In re Luvisi*, 51 CCPA 1063, 342 F.2d 102, 144 USPQ 646 (1965); *In re Neave*, 54 CCPA 999, 370 F.2d 961, 152 USPQ 274 (1967).

For a similar holding, reference is made to *In re Waymouth and Koury*, 182 USPQ 290, CCPA (1974). In this case, the claims on appeal were directed to a lamp having an arc tube containing halogen in mercury atoms present in a ratio of 0.08 to 0.75. The prior art reference disclosed a similar device containing halogen and mercury atoms. The calculated ratio of halogen to mercury atoms inherently disclosed in the reference ranged from 0.0000001 to 1.3. Although the prior art range enveloped the narrower range claimed by appellant, the court reversed the rejection of the claims in view of the unexpectedly superior results achieved by operating within the claimed range.

In the present case, similarly as in the *Russell* and *Waymouth* decisions, applicants' invention involves the use of the catalyst having characteristics which are not taught by the prior art and which produce unexpectedly superior results which are not recognized by the prior art references. Accordingly, applicants respectfully submit that the claims are patentable over the prior art references by virtue of the claimed silicon/aluminum atomic ratio of 180 – 1000.

In addition to the requirement in claims 20 and 37 of a silicon/aluminum atomic ratio of 180 - 1000, these claims require an inlet temperature of 500° to 600° C and claim 37 specifies a space velocity (LHSV) of 10 to 30 h⁻¹. Claim 20 further recites an olefin partial pressure of from 0.1 to 2 bar. Colombo does not disclose or suggest this particular combination of parameters and instead discloses, in addition to the very broad range of the silicon/aluminum ratio, broad ranges of olefin partial pressure, space velocity, and temperature. Thus, Colombo specifies a temperature of 400° to 600° C, a space velocity of 5 to 200 h⁻¹, and a pressure of 1.5 to 7.5 atmospheres. The only qualification on space velocity appears to be a space velocity of less than 50 h⁻¹ if the pressure is

atmospheric and greater than 50 h^{-1} at a pressure of from 1.5 to 7.5 atmospheres. In fact, with the single exception of Example 36, the space velocity in Colombo is well below the 10 to 30 h^{-1} range called for in claim 37 or well above this range as in Examples 32-35. In Example 36 of Colombo, the space velocity is 20 h^{-1} . However, Example 36 does not specify a silicon/aluminum atomic ratio within the range called for in applicants' claims, and the only inference that can be drawn from the reference disclosure is that this ratio, like the ratio of the other examples of silicalite -1 disclosed in the reference, is well above the upper limit of 1000 called for in the claim. In this respect, every example of silicalite -1, as described in Colombo, specifies that no aluminum is present.

Applicants would respectfully disagree with the Examiner's position that data in Colombo indicates that the olefin contents of the feed and product are substantially the same by weight as set forth in claim 37. Nor are they within $\pm 15\%$ of each other as set forth in claim 43 or with $\pm 10 \text{ wt. \%}$ as recited in claim 44. Further, it is again noted that claim 37 requires, in addition, a temperature range of $500^\circ - 600^\circ \text{ C}$ and a space velocity of 10 to 30 h^{-1} . As noted above, with the exception of Example 36, all of the space velocities shown in the various examples of Colombo are outside of the claimed range. As to relative olefin content of the feed and the effluent, there is no clear indication in the various examples that these values are within $\pm 15\%$. In some cases they are clearly outside of this range. For example, the products in Examples 16-23, which show high selectivity to BTX, clearly do not involve an effluent having an olefin content within 15% of the olefin content of the product stream. In other examples it is impossible to determine whether the claimed relationship between the feed stream and the effluent stream is met. Similarly, Examples 1-6 show a very high product in the effluent of C_{5+} compounds. It is not clear whether these are saturated or unsaturated, and thus again, a determination as to the relevant olefin content of the feedstock and effluent cannot be made. In

any event, it will be recalled that whether or not these various examples involve an effluent and a feedstock having olefin contents within 15%, they clearly do not involve the space velocity requirements of claim 37. The sole example of Colombo, which does indicate a space velocity within applicants' claimed range, is Example 36, as noted above. Example 36 does not, however, disclose the relationship between the olefin contents of the feed and the effluent as claimed. Moreover, the disclosure in Example 36 of Colombo indicates that the relative olefin contents of the feed and effluent could be substantially different. In this respect, the olefin content of the feed in Example 36 is 100% normal butene whereas the identified olefin content of the effluent (propylene, ethylene, and isobutylene) is about 50%. About 4-5% of the effluent is identified as saturated gases, with the remainder being identified as C₅₊ liquids. Presumably, substantial portions of these liquids would be olefins resulting from butene oligomers which are unsaturated. However, if as much as even 30% of the C₅₊ liquids are saturated, it is clear that the olefin content of the effluent would not be within 15% of the olefin content of the feedstock.

As to the Examiner's alternative ground based upon inherency, applicants would respectfully note that the law is well settled that for an alleged inherent feature to result from a prior art teaching, it is necessary that this inherent feature necessarily flow from the teachings of the prior art. Thus, an alleged inherent feature must be a necessary result and not merely a possible result. This principle is stated in MPEP Section 2112:

The fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. (Emphasis original)

Section 2112 reflects the general rule that for inherency to reside, it must be shown that the alleged inherency is necessarily present and not a mere possibility. Thus, as stated by the Board in *Ex parte Keith*, 154 USPQ 321 (Bd. of App. 1966), in reversing the Examiner's rejection based upon

inherency:

There are other possible courses the reaction could follow . . .
Asserted inherency must be a necessary result and not merely a possible result.

As indicated in Section 2112, this principle was more recently followed by the Board in *Ex parte Levy*, 17 USPQ2d 1461 (Bd. of App. and Interf. 1990), where the Board reversed an inherency rejection, stating as follows:

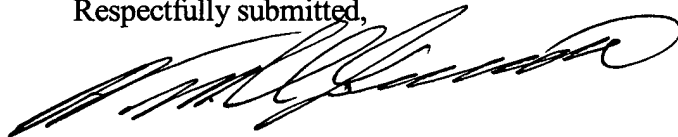
In relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the alleged inherent characteristic necessarily flows from the teachings of the prior art (citing cases). (emphasis original).

Here, this claimed subject matter clearly is not inherent in Colombo.

For the reasons advanced above and in view of the terminal disclaimers submitted herewith, it is respectfully submitted that this application is now in condition for allowance and such action is respectfully requested.

The Commissioner is hereby authorized to charge the Locke Liddell & Sapp LLP Deposit Account No. 12-1781 for any additional fees connected with this communication.

Respectfully submitted,



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